

# Noxious Times

a quarterly publication of the California Interagency Noxious Weed Coordinating Committee

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## **New Regulations on Aquatic Pesticides**

On March 12, 2001, the 9<sup>th</sup> Circuit Court of Appeals in San Francisco made a first-of-its-kind ruling, stating that pesticides applied into or onto the water are subject to the Clean Water Act (CWA), the same as industrial wastes. Until this time all pesticides had been subject only to FIFRA (the Federal Insecticide, Fungicide, and Rodenticide Act). The CWA requires that all discharges of waste must be covered by a waste discharge permit, otherwise known as an NPDES or National Pollution Discharge Elimination System permit. Fines for discharging a waste without a permit can range as high as \$25,000 per discharge per day, and dischargers are also vulnerable to citizen civil suits.

The case that led to the ruling was Talent Irrigation District v. Headwaters, Inc. (No. 99-35373). Headwaters, a non-profit group, sued the irrigation district for not having a discharge permit when it allowed water treated with acrolein (Magnicide H) to escape from its irrigation canals into a natural stream. Acrolein is a highly toxic biocide that is intended for use only in water handling systems, and it killed over 92,000 juvenile steelhead in the stream.

The ruling potentially spelled great trouble for many public and quasi-public agencies that manage the aquatic environment for the public benefit. Water delivery and power generation agencies often use copper and other pesticides to keep down algae and other contaminants in their water systems. Without treatment, the problem organisms will slow water movement or affect its quality. Vector control agencies treat thousands of small areas to prevent outbreaks of mosquitoes and the diseases they carry. Other agencies treat waterways to keep them clear of weeds and improve access for boating, swimming, and fishing. Groups that control or eradicate noxious weeds were concerned whether they would be able to continue removing these aggressive invaders. Many of these problems are very temperature-sensitive

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## **Update: Federal Weed Bills**

### *Bills move slowly through both houses*

Two federal weed bills with the potential to provide over \$100 million annually in funding continue to move slowly through both houses of congress this summer. Congressman Joel Hefley (R-Colorado) introduced H.R. 1462, the companion bill to Senate Bill 198, on April 4. Senator Larry Craig introduced S. 3222 last year and reintroduced it this year as S. 198. Nearly identical in language, the two bills require the secretary of the interior to establish an advisory committee of 10 or less individuals to provide funding through states to eligible weed management areas.

During a hearing on the House bill on June 19, Senator Craig testified about the need for the bill and for S 198 as well. Department of the Interior Science Advisor Dr. Jim Tate discussed the economic impact of invasive species, reporting that invasive plants cause \$20 Billion annually in damage. The Senate Bill has seen little activity recently though both bills should receive more attention after the August recess.

The bills would provide federal money administered by the states to weed management areas. The bills are essentially broken into two parts. The first part, if passed, provides authorization to allocate money in the bill. The second part deals specifically with how

*continued on page 7...*

## CINWCC Signatory Agencies and Representatives

California Agricultural Commissioners and Sealers Association

Jerry Prieto (559) 456-7510

California Department of Food and Agriculture

Nate Dechoretz (916) 654-0768

Steve Schoenig (916) 654-0768

California Department of Transportation

Larry Shields (916) 654-4329

California Resources Agency

Bonnie Turner (916) 445-9992

Department of the Army, U.S. Corps of Engineers, South Pacific Division

Phil Turner (415) 977-8058

U.S. Department of Agriculture, Natural Resources Conservation Service

Dave Dyer (209) 727-5319

U.S. Department of Agriculture, Animal and Plant Health Inspection Service

Dan Hamon (916) 857-6258

Carolyn Pizzo (916) 857-6272

U.S. Department of Agriculture, Forest Service

Cheri Rohrer (415) 705-2545

U.S. Department of Defense, Air Force

Mary Lamb (415) 977-8851

U.S. Department of Interior, Bureau of Indian Affairs

Dale Morris (916) 978-6051

U.S. Department of Interior, Bureau of Land Management

Diana Brink (916) 978 4645

John Willoughby (916) 978-4638

U.S. Department of Interior, Bureau of Reclamation

Jim Scullin (916) 978-5038

U.S. Department of Interior, Fish and Wildlife Service

Pending

U.S. Department of Interior, National Park Service

Curt Deuser (702) 293-8979

Mietek Kolipinski (415) 744-3870

## Active Stakeholders

California Association of Nurserymen

Jack Wick (916) 928-3900

California Cattlemen's Association

Ken Zimmerman (562) 866-1400

California Exotic Pest Plant Council

Jake Sigg (415) 731-3028

California Native Plant Society

Jake Sigg (415) 731-3028

The Nature Conservancy

John Randall (530) 754-8890

U.S. Department of Agriculture, Agricultural Research Service

Ray Carruthers (510) 559-5800

Joe Balciunas (510) 559-5975

University of California

Joe DiTomaso (530) 754-8715

# California Statewide Weed Management Area 3<sup>rd</sup> Annual Meeting

On September 24<sup>th</sup>-25<sup>th</sup>, 2001 the 3<sup>rd</sup> Annual Weed Management Area\* Meeting will be held at the Heidrick Agricultural History Center in Woodland starting at 1:00pm on Monday. This meeting is an opportunity to hear presentations on the evolution of the WMA program, share success stories, discuss challenges, and foster enthusiasm and collaboration among the different groups. At least one representative from each WMA is required to attend, but more are welcome.

Please contact Carri Benefield ([cbenefield@cdfa.ca.gov](mailto:cbenefield@cdfa.ca.gov)) or Steve Schoenig ([sschoenig@cdfa.ca.gov](mailto:sschoenig@cdfa.ca.gov)) at (916) 654-0768 to reserve seats for the attendees from your WMA.

## Tentative Agenda

### DAY 1: September 24<sup>th</sup>, 2001

1:00pm-1:15pm	Introduction and Welcome
1:15pm-2:30pm	Funding ( <i>Assembly Bill 1168/Senate Bill 1740 updates; Other Funding Opportunities</i> )
2:30pm-3:00pm	Break
3:00pm-3:45pm	Planning ( <i>Why develop a strategic plan?; benefits to and elements of a strategic plan</i> )
3:45pm-5:15pm	Education and awareness ( <i>How to reach out to wide audience; successful projects</i> )

\*\*\*\*\*

6:00pm-9:00pm Dinner- A barbeque hosted at a local ranch

\*\*\*\*\*

### Day 2: September 25<sup>th</sup>, 2001

8:00am-9:15am	Maximizing success ( <i>How to keep 'em coming to the meetings; collaborative project ideas</i> )
9:15am-10:15am	Regional Group Breakouts ( <i>small group discussions, project sharing</i> )
10:15am-10:30am	Break
10:30am-11:45am	Control, Containment, and Eradication— it is the name of the game!
11:45am-12:00pm	Closing and Adjourn

\*Weed Management Areas (WMAs) are local organizations that bring together landowners and managers (private, city, county, State, and Federal) in a county, multi-county, or other geographical area to coordinate efforts and expertise against common invasive weeds species.

Noxious Times is a publication of the California Interagency Noxious Weed Coordinating Committee. The committee was formed in 1995 when 14 federal, state, and county agencies came together under a Memorandum of Understanding to coordinate the management of noxious weeds. The committee's mission is to facilitate, promote, and coordinate the establishment of an Integrated Pest Management partnership between public and private land managers toward the eradication and control of noxious weeds on federal and state lands and on private lands adjacent to public lands.

The Noxious Times newsletter intends to help the committee achieve its goals of coordination and exchange of information by providing land managers throughout the state with information on weed control efforts, news, and successes.

Noxious Times is published quarterly by staff of the Integrated Pest Control Branch at the California Department of Food and Agriculture. We welcome submissions for our upcoming issues. Please send to: CA Department of Food and Agriculture, ATTN: Noxious Times, 1220 N Street, Room A-357, Sacramento, CA 95814 or e-mail: [noxtimes@cdfa.ca.gov](mailto:noxtimes@cdfa.ca.gov)

If you have a colleague whose name you would like to add to our mailing list, please send mailing information to the address above.

Noxious Times Editorial Staff: Matt Caldwell, Carri Benefield, Steve Schoenig, Pat Akers, Marcia Dewit. Text written by staff unless otherwise noted.

### *...Pesticide Regulations continued from page 1*

and the ruling came right at the beginning of the treatment season.

The chorus of anxiety reached the attention of the Department of Pesticide Regulation and the State Water Resources Control Board. The Board, along with the Regional Water Quality Control Boards, controls the waste discharge permit process and is responsible for enforcing the CWA. The Board directors and staff perceived the situation as critical and committed to developing an emergency state-wide general permit. The process began near the end of April, and on July 19 the Board adopted the permit. Typically, a permit takes 1-3 years to develop and may cost tens of thousands of dollars in fees alone, so this was a notable effort on their part.

The process involved a series of meetings between the Board's legal and technical staff, the affected user community, and representatives of environmental groups. The Board first prepared a Cleanup and Abatement Order (CAO), because it could be adopted rapidly. The CAO spared applicators fines under the CWA, but it still left them open to potentially costly citizen suits. As such, it was not a desirable long-term solution, so work continued on a drafts of the general permit, with comments provided at each stage by the different interested groups. The challenge for the Board was to develop a permit where it would be possible for the user community to continue their work, while meeting the requirements of the CWA. The CWA was designed with the basic assumption that any toxicity is unacceptable. Now it was being used to regulate chemicals that are applied to water specifically to kill organisms, but those organisms would otherwise degrade the use of the water. This presented the Board an unusual problem.

The last draft of the permit had some frightening implications for applicators. One such issue was a requirement to have "a qualified biologist certify that beneficial uses had been fully restored to levels before the [treatment] project". In the meetings, applicators had questions about the meaning of nearly every word in that phrase. Another concern was that the permit would cover only "public entities", a limitation that arises from the wording in the CWA and in formal agreements between California and the USEPA about the conditions under which "toxic" materials may be released into the water. However, the major concern, throughout the whole process and in the final draft, was the extent of the monitoring that would be required of each applicator.

Under the CWA, some form of "monitoring" is essentially unavoidable. By the last draft there were a dozen monitoring requirements, some of epic proportions. For instance, point three required an "Assessment of ... potential routes of exposure, life cycle bioassessments on a range [of] species, biochemical and/or physiological testing of sublethal effects including reproduction and growth." Point six required a "Community monitoring survey...to evaluate the impact of pesticide applications on organism diversity and ecosystem integrity relative to similar ecosystems where the applications do not occur." While the draft encouraged applicators to work through a consortium to develop these studies, no such institution presently exists and the applicator community would have had to construct it themselves. Failing that, the language indicated that each individual applicator would be responsible for all the required information, either by literature review or new studies. Over 200 people attended the final hearing on the permit, most of who represented concerned applicators.

The requirements of the final permit are much less onerous than the last draft (see summary on sidebar), and the Board may have set some precedents in creating it. The final permit dropped the "qualified biologist" language, will cut the fee for applying for the permit from \$1200 to \$400 per year, dropped language that defined dead plants as waste, and expanded the definition of "public entities" to include such groups as homeowners associations and private entities that are providing the same water delivery or other services that are commonly provided by a public body. The permit also provides for exemptions for some of the very low toxicity pesticides used by vector control agencies. Most importantly, the Board assumed responsibility for the extensive scientific studies proposed under the last draft of the permit, and they will attempt to find funding for those studies. At this time, applicators will not be required to contribute for those studies. Applicators should breathe a small sigh of relief, as the final outcome could have been much worse. The Board found itself placed in a difficult position, but its members clearly recognized the importance of many of the treatments made to water, and they went out of their way to meet the concerns of all sides. ❖

## NPDES Permit Requirements

*Disclaimer: This summary does NOT substitute for the NPDES permit or make any recommendations for meeting its requirements. Read the permit at [www.swrcb.ca.gov/quality.html](http://www.swrcb.ca.gov/quality.html) and contact the SWRCB with questions. Initial contacts may be made through:*

Larry F. Nash, P.E.  
State Water Resources Control Board  
1001 I Street, 15th floor  
Sacramento, CA 95814  
916-341-5586, Fax 916-341-5463  
[nashl@dwq.swrcb.ca.gov](mailto:nashl@dwq.swrcb.ca.gov)

### Requirements Under the NPDES Permit:

1. Submit a Notice of Intent (NOI) to apply for the permit, with maps of application areas and \$1200 application fee (to be reduced to \$400 next year). The NOI is included with the permit document at the Web site.
2. Provide a copy of Pesticide Use Reports monthly to the Regional Water Quality Control Board (RWQCB).
3. Follow sound integrated pest management practices (identified as best management practices in the permit).
4. Provide a list of contacts to the RWQCB.
5. Submit a monitoring plan by March 1, 2002. The monitoring plan must evaluate at least one representative project for each pesticide applied. Each plan must address each of the following elements:
  - a. A description of pesticide applications that reflects the diversity of pesticides used, seasons of applications, locality types where applications are made, climates, rates of pesticide application, application methods, and project size.
  - b. Visual assessments of existing or potential impacts on water quality or the environment by the pesticide.
  - c. Water sampling and analysis for active ingredients to demonstrate their disappearance from the treatment area. This analysis may also include other water quality parameters such as dissolved oxygen, turbidity, and pH.
  - d. A Quality Assurance Program, which describes the sampling and analysis methods and how those methods provide reliable analysis results.
  - e. A description of non-chemical or non-toxic control methods and reasons for choosing or rejecting those methods.
  - f. Evaluation of the effectiveness of best management practices in reducing impacts or discharges.
6. Maintain records on the locations and sizes of treatment areas, and on the pesticides used (by Pesticide Use Reports).
7. Beginning January 2003, provide an annual report summarizing pesticide monitoring data.

# National Fish and Wildlife Foundation

## *2001 Pulling Together Initiative Grant Recipients*

American Land Conservancy  
*Bear Creek Watershed Restoration III*  
Challenge Funds \$118,000  
NFWF Federal Funds \$50,000

Foundation for CSU Monterey Bay  
*Fort Ord's War on Weeds III*  
Challenge Funds \$174,450  
NFWF Federal Funds \$57,000

Bureau of Land Management, Arcata  
*Humboldt Bay Dunes Restoration Phase V*  
Challenge Funds \$65,000  
NFWF Federal Funds \$40,000

Bureau of Land Management, Eagle Lake  
*Lassen County Weed Control V*  
Challenge Funds \$28,850  
NFWF Federal Funds \$28,850

Arizona Fishery Resources Office, Parker  
*Lower Colorado Giant Salvinia Eradication*  
Challenge Funds \$190,000  
NFWF Federal Funds \$64,000

California Dept. of Food and Agriculture  
*Northern California Purple Loosestrife Control*  
Challenge Funds \$40,900  
NFWF Federal Funds \$39,000

Inyo/Mono Counties Agricultural Commissioners Office  
*Owens Basin Weed Control and Outreach III*  
Challenge Funds \$222,250  
NFWF Federal Funds \$46,000

Plumas/Sierra Department of Agriculture  
*Plumas/Sierra Noxious Weed Control II*  
Challenge Funds \$38,700  
NFWF Federal Funds \$26,500

Mission Resource Conservation District  
*Santa Margarita Watershed Weed Management II*  
Challenge Funds \$82,000  
NFWF Federal Funds \$35,000

## 2001 CIPM Grants Awarded

The Center for Invasive Plant Management has awarded \$70,352 in grants for its 2001 grants program. Grants were awarded to 12 applications in five western states in the categories of Seed Money, Applied Science, and Multidisciplinary Research Planning. Topics ranged from studying weed invasion to mapping of invasive plant populations in the West to defining ecological management techniques. A complete list of awards is posted on the Center's web site: [www.weedcenter.org](http://www.weedcenter.org).

The Center for Invasive Plant Management promotes ecologically sound management of invasive plants in western North America by promoting research and public education and by facilitating regional collaboration and communication among researchers, educators and land managers. The center is based at Montana State University in Bozeman, Montana.

Requests for proposals for CIPM's 2002 grant program will be posted at [www.weedcenter.org](http://www.weedcenter.org) in January 2002.

For more information, contact CIPM Director Janet Clark at 406-994-6832, or email at [cipm@montana.edu](mailto:cipm@montana.edu)

# California Exotic Pest Plant Council 10<sup>th</sup> Anniversary Symposium

## "Achievements and Challenges in Weed Management"

The theme for this year's California Exotic Pest Plant Council symposium is "Achievements and Challenges in Weed Management." It will be held at the Handlery Hotel in San Diego on October 5-7. The symposium will take a look back on the last ten years and, true to its name, review the many achievements and challenges encountered controlling invasive species. This year's focus is how endangered species are affected by invasive weeds and in turn how endangered species affect treatment of invasive weeds.

The symposium gets kicked off on Friday with an all day symposium cosponsored by the U.S. Geological Survey. Friday's symposium will cover the impact of global climate changes on vegetation and habitat in the southwest. On Saturday there will be two concurrent sessions for presentations on various subjects concerning invasive species. There will also be two sessions for working groups focusing on more than a dozen invasive species including yellow starthistle, arundo, the brooms, and many others on Friday and Saturday. Among others, Dr. Nelroy Jackson, a member of the National Invasive Species Council, will be speaking. In addition, Dr. John Randall will give his annual update on new weeds.

Field trips, a favorite of many attendees, are scheduled for Sunday. The first of the three field trips will visit local estuaries and lagoons confronted with *Caulerpa taxifolia*, a marine alga. The second trip will be to the Black Mountain Open Space Reserve and Penasquitos canyon. Topics for this trip include artichoke thistle, fennel, salt cedar, arundo, cape ivy, the role of volunteers in control efforts and finally the politics of

eucalyptus removal. A third trip will visit the Santa Rosa Plateau and Lake Hodges and deals with restoration of native grasses and wildflowers. There will be a side trip to the Bonsall Preserve, overrun by arundo and cape ivy with no control efforts planned.

### Tentative Schedule

#### Friday, October 5<sup>th</sup> Schedule

**7 a.m.** Registration and Refreshments

**8:00 Session I:** Multidisciplinary Invasive Plant Research. Topics cover an overview of invasive species in the southwest and invasive species' impacts on the desert ecosystem.

**11:30** Lunch

**12:30 Session II:** Weed Management Groups in Southwestern North America. Includes speakers from various organizations and includes a panel discussion.

**4:30** Poster Session and Social

**5:30** Dinner

**7:00 Session III:** Working group Session I. Desert Organization/ SW EPPC, brooms and gorse, cape ivy, Cortaderias, *Lepidium latifolium*, volunteers.

#### Saturday, October 6<sup>th</sup> Schedule

**8:00 Session IV:** Rapid Response to New Invasions. Covers *Caulerpa taxifolia*, and *Anonas* (fieldrest harrow)

**9:30** Morning Break

**9:50 Session V:** Endangered Species and Invasive Weeds: Use by, Impacts on, and Control/ Regulatory Issues.

**11:45** Luncheon (included in registration)

**1:00 Session VI:** Business meetings, First Alerts

**1:50 Session VII:** Working Groups

Session II. Arundo and Tamarisk, *Brassica tournefortii*, Education, Ehrharta grasses, Fennel, Yellow starthistle

**3:15** Afternoon Break -- Refreshments served

**3:30 Session VIII:** Concurrent sessions I and II. Two concurrent sessions with research presentations.

#### Sunday, October 7<sup>th</sup> Schedule

**8:30** Field Trips Depart Hotel

### Conference Registration

The registration form and full schedule are available on-line in PDF form at [www.caleppc.org](http://www.caleppc.org). Email Mike Kelly at [mkellysd@aol.com](mailto:mkellysd@aol.com) or write to him at 11591 Polaris Dr., San Diego, CA 92126 to obtain and return registration forms. Early registration is \$80 before September 15th, field trips are extra.

### Hotel Reservations:

Handlery Hotel, 950 Hotel Circle North, San Diego 92108. (Off I-8 near I-5)

Reservations call 1-800-676-6567. Call between 8 a.m. - 5 p.m, M-F for conference room rates. Room rates: \$84 plus tax for state employees with ID, all other registrants: \$89 single, \$92 double, triple or quad. Suites are \$179. **Deadline for room reservations is Sept. 4th.**

### Transportation from San Diego Airport

-Taxi \$18 unlimited # of people;  
-Cloud 9 shuttle \$7.50 per person each way. No reservations from airport are needed, but reservations from Hotel to airport are needed.

Call 24-48 hours ahead, Cloud 9, 1-800-9-shuttle ❖

## Prescribed Grazing Used For Flood Control

Article contributed by:  
Rob Rutherford

The County Engineering department of San Luis Obispo was faced with a continuing dilemma. They were charged with maintaining several flood control channels, but the existing tools of herbicides, dredging, burning, and hand crews were proving to be either too expensive or forbidden by other agencies. The Los Berros creek and lower Arroyo Grande Creeks are bordered by agriculture and residences. These water courses are also potential habitat for red legged frogs and steelhead - not to mention other species of concern.

County Engineer, George Gibson, worked with Bob Blanchard, local livestock owner to reduce the vegetation in these channels using about 350 goats. The goats grazed approximately 1 acre per day and were contained by portable electric fences. This represented about 150 feet of ditch each day. Residents came out in droves each day to see the goats and were extremely appreciative of the effort. The goats removed all but the heaviest vegetation (e.g. willow trunks) which was removed by CDF crews after the goats had

moved through. Surprisingly, the animals consumed plants including hemlock and castor bean without becoming ill.

The project was brought to a halt after only 30 days due to concerns about riparian habitat in the very lowest part of the channel.



Rob Rutherford

During the February 2001 rains, the grazed channel handled the flood waters without incident. However, where grazing had been halted, the channel flooded and caused approximately \$2.5 million worth of damage to crops and improvements. It is believed that one reason for successful results in the upper parts of the channel is that the goats left closely cropped vegetation, while further scouring and sedimentation did not occur.

This year, goats will be used again - and grazing will be carried further downstream to prevent the damages experienced in 2001. This project is a positive example of County Government working in partnership with a private citizens to create a solution to a problem with a tool that is economically, ecologically, and socially sound. ❖

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## INVENTORY OF *EGERIA DENSA* AND WATER HYACINTH IN THE CENTRAL DELTA AND SELECTED TRIBUTARIES USING COLOR IR AIRPHOTOS

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This fall, the California Department of Boating and Waterways (DBW) will contract for vertical aerial infrared photography over the waterways of the Sacramento/San Joaquin Delta. The primary objective is to aid DBW in controlling two aquatic weeds in the Delta, water hyacinth (*Eichhornia crassipes*) and egeria (*Egeria densa*) by acquiring continuous complete mono coverage of the Delta waterways.

The color infrared aerial photographs will be flown at low tide at 1:24,000 scale using 180 color IR aerial film positives with forward or side overlap of approximately 20% where required, and a maximum sun angle of 35 degrees to minimize water absorption while keeping shadows on the waterways to a minimum. The flight will produce approximately 95 exposures of approximately 300 linear miles of waterways.

The Romberg Tiburon Center for Environmental Studies at San Francisco State University will scan-digitized and color

separate the photographs using a high-quality transparency scanner. Geometric correction will be performed as appropriate and estimates of acreages and percent coverage of the weeds will be interpreted allowing DBW to track annual evaluation of its control programs. In addition, ground surveys will be conducted to verify image interpretations.

The flight line will include the Sacramento/San Joaquin Delta, the San Joaquin River (up to Fresno), and the Merced, King's and Tuolumne Rivers up to designated points. It is anticipated that the flight will occur the first week of September, tides and weather permitting.

The imagery and selected results will be incorporated into the existing *Egeria* Project Web database, which is on-line at: <http://romberg.sfsu.edu/~egeria>.

For more information contact Pat Thalken at [mthalken@dbw.ca.gov](mailto:mthalken@dbw.ca.gov) ❖



## Native Grasses: Revegetation and Weeds

The USDA-NRCS Lockeford Plant Materials Center has released many native grasses, which can be used to compete with weeds. On revegetation and restoration sites where weeds have been controlled, you might consider using 'Rio' beardless Wildrye in channel areas or areas which have additional moisture. 'Mariposa' Blue wildrye, *Elymus glaucus*; LK115d, LK215e and LK315d purple needle grass, *Nassella pulchra*; LK415f, foothill needle grass, *Nassella cernua* and 'Cucamonga', California brome, *Bromus carinatus* could be used on upland sites.

Consult with your local NRCS field office to determine adaptability to climate and soil conditions. Seed is available from commercial seed companies. Small quantities of seed might be available through the NRCS field-planting program. For more information contact Dave Dyer at 209-727-5319 or [Dave.Dyer@ca.usda.gov](mailto:Dave.Dyer@ca.usda.gov)

...*FEDERAL WEEDS continued from page 1*

much money should be allocated. The first part of the bill may be passed before the amount of money provided in the second is agreed upon. The amount of money is not set as of yet though Senator Craig's bill initially called for \$100 million.

The amount of money that will eventually be allocated could range from between \$40 million to \$130 or more—more being less likely. One important factor in its impact on California is the establishment of the weed management areas that will be receiving the funding administered by the state. Many weed management areas were established as a result of SB 1740 and AB 1168, two Bills passed in California that provided a total of \$5 million to weed management areas in California. With these areas established, the funding from the federal government can be administered in a more efficient manner than it would have otherwise.

One of the criteria for funding in the bill is how prepared entities are to receive the funds. The west and California are the most prepared and as a result stand to receive considerable funding. ❖

## Comprehensive Yellow Starthistle VIDEO Just Released!

### "Yellow starthistle: Managing An Invasive Alien Species"

Are you charged with educating the public about yellow starthistle? Well, a fantastic new video has just been released to help you in your education outreach efforts. Over the course of the last year, Leif Joslyn of Ecovisions has been hard at work wrapping up work on a comprehensive video on yellow starthistle, one of California's most widespread weeds. The video captures the history of its introduction and spread, the biology, the problem, available control methods, and more.

#### Two Versions Available

Depending on your target audience, both short (26 minute) and long (50 minute) versions of the video are available. The video is broken up into three parts: (I) Part One- Background and Biology, (II) Part Two-Control Methods, and (III) Part Three- Yellow Starthistle and Beyond.

#### Public Service Announcement Also Available

In addition to the video, two Public Service Announcement (PSAs) were developed. Does your local T.V. station run PSA's? If so, this might be a prime opportunity to plug invasive species in your part of the state!

#### How Do I Order a Copy?

The video is available for \$23 including sales tax and shipping from Xenobiota Xposures at: 62 Stratford Rd., Kensington, CA 94707

For more information about the video or the PSA contact Leif Joslyn at [leif@xenob.com](mailto:leif@xenob.com), (530) 524-3031 or check out [www.starthistle.org](http://www.starthistle.org)



# Economic Impacts of Inv

## Economic Impacts of Invasive Plant Species

The economic impacts of invasive plant species are far-reaching; affecting agricultural productivity in crops and livestock, destroying native animal and plant ecosystems, reducing recreational opportunities, obstructing waterways, lowering land real estate values, and posing health and safety concerns for humans and livestock. Past economic impact analysis has focused primarily in agriculture where losses of \$26.4 billion per year have been attributed to weed infestations (Mack, 2000). Threats to biodiversity and ecosystem services by invasive species turn indirectly, into economic losses when there are reductions in crops, forests, fisheries and rangeland capacity; and environmental impacts including, increases in soil erosion and surface water runoff; and losses in flood protection and wildlife habitat. Using economic analysis tools, such as benefit-cost analysis, to measure economic losses in dollar terms, would add substantial proof of the significant costs to society for failing to control the spread of invasive species.

**Estimated annual costs associated with non-indigenous (NI) plants (Pimentel, 1998)**

Plants	Losses and damages (x \$1 million)	Control Costs (x \$1 million)	Total Costs (x \$1 million)
Purple loosestrife	N/A	45	45
Aquatic weeds	10	100	110
Crop weeds	23,400	3000	26,400
Pasture weeds	1,000	5000	6,000
Weeds in lawns, gardens, golf courses	N/A	1500	15,000
Total Costs Non-Indigenous plants	24,410	9,645	34,055

## Economic Costs of Invasive Plants

### Agriculture

Invasive weeds impose two main categories of economic losses: 1) loss in production output and 2) direct costs of weed control. Agricultural crop yields and forage values for domesticated animal grazing are reduced on weed infested lands, resulting in reduced profits for farmers and ranchers. The second category of costs are the direct costs of controlling weeds, including the costs of herbicides, biocontrol, and other methods of weed control, also resulting in reduced profits (Mack et al., 2000).

Weeds reduce crop yields by 12% in the United States. The potential value of all U.S. crops is over \$267 billion per year, but \$23.4 billion in crop value is lost to invasive plant

species. Herbicide control of non-indigenous weeds in agricultural crops, represent \$3 billion in costs each year. Total cost for invasive plants species is \$26.4 billion per year in the United States (Pimental, 2000).

### Pastures and Rangelands

Pastures provide \$10 billion in forage crops each year in United States (USDA, 1998). Non-indigenous plant species in pastures cause a loss of \$1 billion in reduced forage yields, annually. The U.S. Department of Interior reported that noxious weeds have infested 17 million acres of public lands in the Western United States. Invasive rangeland weeds impose costs by reducing the amount of land available for grazing, decreasing cattle stocking rates and increasing costs of herbicide treatments for weed control. Additional costs are the effects on the health of the animals and the contamination of animal products by exposure to toxic weeds. Ranchers spend \$5 billion each year to treat non-indigenous weeds in pastures and rangelands (Pimental, 2000). Spotted knapweed has invaded five million acres of rangelands in the state of Montana and has imposed major economic losses to agriculture, Montana's largest industry. The grazing capacity can be reduced 60% to 90% in spotted knapweed infested areas, resulting in a loss of the forage value of the land and a depreciation of real estate land values. Other costs are increased levels of surface water runoff and soil erosion in infested areas in areas where spotted knapweed has replaced the native bunchgrass species.

### Lawns, Gardens and Golf Courses

Approximately \$1.5 billion per year is spent to control non-indigenous weeds on lawns, gardens and golf courses. Of the \$1.5 billion, residential households must spend \$500 million on exotic weed control and \$1 billion must be spent to control non-indigenous weeds on golf courses each year (Pimental, 2000). Weed trees also have an economic impact. Florida spends \$3-6 million per year to control spread of the melaleuca tree.

### Weeds Reduce Appraised Value of Land

Heavy weed infestations have reduced the appraised value of land, especially when the land's carrying capacity for livestock decreased significantly. In North Dakota, the appraised value of a ranch infested with leafy spurge decreased from \$100-\$125/acre in 1975 to \$40/acre in 1991

Estimates of Values of  
Ecosystem Services  
(World Resources Institute,

Ecosystem  
Services  
(US\$ 33 trillion)



# invasive weeds

By: Marcia DeWit, a CA Dept. of Food and Agriculture intern recently here from Colorado focusing on weed economics

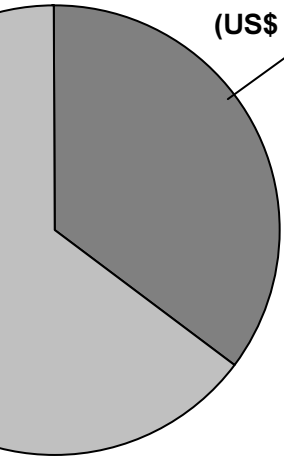
(Weiser, 1995). The annual cost to control (not eradicate) the leafy spurge on the ranch was estimated to be at about \$20/acre. In Klamath County, Oregon, the value of a 1,360 acre ranch dropped from \$170,000-\$204,000 (uninfested) to \$27,500 in 1988 when it became heavily infested with leafy spurge (Weiser, 1995).

## Environmental Impacts—Biodiversity and Ecosystem Losses

Invasive weeds reduce local biodiversity by outcompeting native vegetation and displacing wildlife that depends on native plants for their forage. Non-indigenous species are spreading at a rate of 700,000 hectares per year in United States wildlife habitat areas (Pimental, 2000). For example, across the U.S. purple loosestrife is spreading at a rate of

115,000 hectares a year and is changing the structure of the wetlands. Purple loosestrife has reduced the biomass of 44 native plant species and endangered the bog turtle and several duck species that rely on the native plants. The economic impacts of weeds on ecosystems, such as forests, wildlands, aquatic, wetland, riparian and rangelands are poorly documented because of the difficulty in assessing costs of environmental damage to ecosystems. Many of the damages by non-indigenous species impact what are known as “nature’s services” (Daily, 1999),

Human Economic Activities and  
1998–99 and Costanza et al., 1997)  
**Global GNP  
(US\$ 18 trillion)**



## What Are Ecosystem Functions and Services?

In a recent *Nature* article, Robert Costanza states “Ecosystem functions refer variously to the habitat, biological or system properties or processes of ecosystems. Ecosystem goods (such as food) and ecosystem services (such as waste assimilation) represent the benefits human populations derive, directly or indirectly, from ecosystem functions.” Ecosystem services maintain species biodiversity and produce ecosystem goods that humans consume, such as fish, forest products, forage, minerals, biomass fuels, and pharmaceuticals. Ecosystem services provide protection of watersheds, assimilation of human waste products, soil formation, nutrient cycling, regulation of biological productivity, resilience and stability in ecosystems; and intangible aesthetic properties of nature such as beauty, wildness and spiritual values.

## Estimated Values of Ecosystem Services

(World Resources Institute, 1998-99 and Costanza et al., 1997)

Ecosystem Services	Value (trillion \$US)
Soil formation	17.1
Recreation	3.0
Nutrient cycling	2.3
Water regulation and supply	2.3
Climate regulation (temperature and precipitation)	1.8
Habitat	1.4
Flood and storm regulation	1.1
Food and raw materials production	0.8
Genetic resources	0.8
Atmospheric gas balance	0.7
Pollination	0.4
All other services	1.6
<b>Total value of ecosystem services</b>	<b>33.3</b>

functions of ecological systems for protection of watersheds, absorption of human wastes; soil fertility and retention; cycling of matter; maintenance of biodiversity; and intangible values such as aesthetics and intellectual stimulation. The value of these “nature’s services” for the entire biosphere have been estimated to about \$33 trillion annually (Costanza et al. 1997).

A research team derived this value from a study of over 100 published papers using a variety of different valuation methods. Seventeen different categories of services were studied in each of sixteen different types of ecosystems. The average dollar value per hectare for each type of service in each ecosystem was calculated and then multiplied by the total area that the ecosystem occupies on the globe.

## Recreation Value Impacts and Secondary Economic Impacts of Invasive Weeds

Wildlife areas (parks, forests, riparian areas, waterways and rangelands) produce outputs in grazing, forest products, minerals, recreation, wildlife, habitat, erosion control and watershed protection. Loss of wildlife and natural habitats impact outdoor recreation activities and reduce wildlife expenditures that benefit local and state economies. Money spent on guns, licenses, park fees, gasoline, lodging, camping equipment, park fees and restaurant dining are lost when recreation enthusiasts avoid regions infested with invasive weeds. In Montana, fishing, hunting, hiking, backpacking, camping, and horseback riding are popular recreational activities to both Montana residents and visiting tourists. Montana’s total recreation expenditures were \$190 million for hunting, equipment rentals, guide fees, park fees, lodging, camping equipment, photographic equipment in 1991 (Hirsch and Leitch, 1996). Direct and secondary economic impacts represent a loss of \$42 million to Montana’s economy when recreationist avoid knapweed

*Continued on Next Page...*

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infested wildlife areas and seek out other wildlife areas outside the state.

## Economic Methods of Analysis

Several methods of economic analysis are available for use in determining economic impacts of invasive weeds and as a tool in weed control project decision-making. Weed control managers cannot afford to implement a weed program without first knowing if it is economically feasible or cost effective. This is especially true if the function of the land is to make money. Economic analysis methods can aid weed control managers in making economically sound decisions. This article will briefly describe two types of economic analysis methods: benefit-cost analysis and input-output modeling.

### Benefit-Cost Analysis

Benefit-cost analysis (BCA) is a method of comparing in common units, gains and losses from a project or action. Benefit-cost analysis can compare alternative projects and determine which project most benefits society and is the most economically efficient use of limited resources (funds). BCA produces a single number index of the overall effect of a given project on both present and future consumers and producers. BCA can separate the money-losing projects from projects that will provide the greatest dollars in benefits. Besides comparing alternative projects, BCA can also determine the optimal size of a project and the optimal timing of implementing the various components of the project.

#### Using the Benefit-cost Analysis Model:

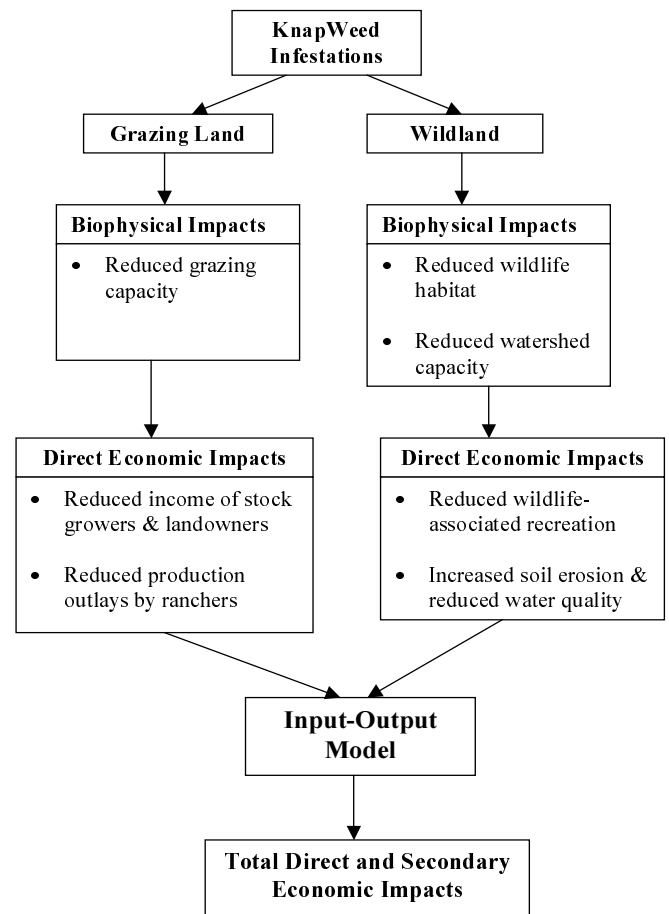
##### Biological Control Program for Tansy Ragwort in Oregon

An invasion of the non-native weed species, tansy ragwort, had caused losses of \$6 million per year to the state of Oregon. A successful biological control of tansy ragwort resulted in an estimated annual benefit of more than \$5 million and a benefit-cost ratio of 13.1. Annual livestock losses were reduced by \$3.7 million/year. Other benefits of the biological control program were increased productivity of pastures by \$1.27 million/year and a savings of \$0.85 million/year in reduced herbicide use. Average annual costs to control tansy ragwort were \$5.00/ha. The cumulative benefits of the program totaled \$16,238,416 and the cumulative costs were \$1,246,685. The resulting benefit/cost ratio is calculated by dividing benefits by costs:  $\$16,238,416 / \$1,246,685 = 13 : 1$ . The tansy ragwort program demonstrated that biological control can produce a high benefit-cost ratio or a high return on investment, especially if the analysis is projected over the length of the project, typically 10-15 years, on average, for biocontrol projects. (H. Radtke and S.W. Davis, 2000).

### Input-Output Model—Regional Economic Analysis

Direct economic impacts that result from invasive weeds also have secondary economic impacts on the regional

economy. Reduced economic activity in one sector will have secondary or indirect effects on regional employment, incomes and expenditures in other sectors of the economy. Input-output analysis is a mathematical tool that follows linkages among the different sectors of the economy and measures total regional business activity resulting from a direct economic impact on one particular sector.



### Direct vs. Indirect (Secondary) Economic Impacts—Using the Input/Output Model

In Montana, knapweed infestations cause a direct economic loss of \$14 million per year resulting from impacts of reduced grazing capacity, reduced wildlife associated recreational spending, and higher rates of soil erosion and surface water run-off. These direct economic impacts have secondary effects and reduce spending in other sectors, such as retail trade, agricultural crops, household, business and government sectors. The secondary economic impacts have a wider scale effect on the state economy and often can result in job losses in the state. The total direct plus secondary economic impacts to Montana, estimated using an input/output model, are \$42 million per year, including the support of over 500 jobs, each year, in the state economy (Hirsch, 1996).

## Role of Economic Analysis in Weed Control Project Decision-Making on a Local Scale

Postponing aggressive action in implementing an invasive weed program will result in higher costs that will exceed the benefits of weed control. The value of the land is reduced to the point that there is no longer any economic incentive to recover the land. In North Dakota, leafy spurge infestations are so severe; it is more cost effective to abandon the land than to control the weeds. In the first three years of leafy spurge infestation, eradication is economically feasible at costs of \$40-\$60 per acre, but after 3 years, the leafy spurge perennial root system becomes so well established, costs increase to \$80-\$120 per acre, making eradication efforts no longer feasible (WA State Noxious Weed Control Board, 1996).

If economic analysis is projected out for decades, eradication projects and successful biological control programs have much higher benefit-cost ratios than weed suppression or containment control strategies. Biological control agents are predicted to control 65% of leafy spurge infested lands, in the states of Montana, North Dakota, South Dakota and Wyoming, by the year 2025. Direct economic benefits to the economy from leafy spurge biological control total \$19.1 million, resulting from increases in the livestock carrying capacity of grazing lands, increases in beef cow/calf production, improved wildlife habitats, and increases in wildlife-associated recreational opportunities (Bangsund, 1999).

## Economic Impact of Weeds in California

Yellow starthistle is one of California's most noxious weeds and has spread from one million acres in 1977 to an estimated 12-15 million acres in 1985 (Klonsky, 1999). Yellow starthistle economic losses are likely substantial. Despite the substantial environmental damage and economic impacts that yellow starthistle and other invasive weeds have caused in California, little thorough research has been done to assess the economic costs of weed invasion in California. There is also a critical need for an economic and geo-spatial model that can predict the future economic impacts caused by the spread of invasive weeds. Invasive weeds spread very rapidly and the economic costs of present or current damages do not accurately depict the future economic implications of current weed control management. Dr. Mark Eiswerth from the University of Nevada has submitted a Senate Bill 1740 research grant to the California Department of Food and Agriculture to study "Economic Losses from Yellow Starthistle in California and Applications to Potential Biological Invasions". Dr. Eiswerth proposes to use dynamic bioeconomic modeling, a mathematical programming model, to predict future optimal levels of yellow starthistle control management, since weed invasion is a dynamic process. Information on the potential future agricultural losses and economic damages, generated from the economic model analysis, could convince California public and private decision makers to invest the necessary financial resources to contain the still expanding yellow starthistle invasion of California. ❖

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# Profile: Califor

## *Exotic Plant Control in California*

### Introduction

Control of invasive non-native plants is a major element of the California Department of Parks and Recreation's (CDPR) natural resource stewardship program for State Parks System lands. Controlling, and eradicating where feasible, invasive species is required to carry out the Department's mission which is:

*To provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.*

The California State Park System consists of 266 units and includes nearly 1.3 million acres, over 280 miles of coastline (almost one third of the California coast) and 625 miles of lake and river frontage. These properties are in all of California's major ecological regions and within 48 of California's 58 counties. A wide range of ecosystems is represented within these park units; coastal wetlands, estuaries, beaches, dune systems, redwood forests, desert washes, palm oases, mountain mahogany covered desert mountains, high Sierra meadows and alpine fell fields, to name a few.

The California State Park System contains the largest and most diverse natural and cultural heritage holdings of any state agency in the nation. These parklands protect and preserve an unparalleled collection of environmentally sensitive habitats and threatened plant and animal species . . . the best of California's natural heritage.

There are also nearly 18,000 campsites; 3,000 miles of hiking, biking, and equestrian trails; waterslides; conference centers; and off-highway vehicle parks within the California State Park System. California State Parks values its diverse ecosystems, diverse habitats, diverse recreational opportunities, and visitors from diverse localities. Unfortunately, park lands are also experiencing invasions by diverse exotic plants and animals.

Departmental resource management policies provide direction to the Department to remove populations of invasive exotics and to refrain from using invasive exotics in landscaping park facilities. Indeed, eradication and control of invasive exotics is one of the most constant and widespread natural resource management challenges and activities for the Department.

Because of the geographic and ecological diversity of the

Department's holdings it is difficult to provide the definitive list of Systemwide "worst weed offenders." Tamarisk, Cape ivy, eucalyptus, pampas (and jubata) grass, yellow starthistle, artichoke, milk, bull, and Italian thistles, tree of heaven, French (and Scotch) broom, periwinkle, European dune grass, ice plant, Veldt grass, hoary cress, acacia, English ivy, purple loosestrife, and Himalayaberry are among the very worst. With very few exceptions, if the exotic poses a wildland weed problem anywhere in California, the problem will occur in California State Parks.

### Park Management and Departmental Organization

Management objectives of individual properties within the California State Park System differ depending on the values and purposes for which the park unit was acquired. Objectives range from a preservation mandate to a recreation emphasis, depending upon a unit's classification. Basic management goals are provided in the classification statutes. For example, in State Reserves and State Parks, natural resources are to be managed to protect and restore indigenous flora and fauna and native environmental associations. For a complete discussion of the management goals for the various State Park System unit classifications, please see California Public Resources Code Sections 5019.50-5019.80 at:

[http://www.leginfo.ca.gov/html/prc\\_table\\_of\\_contents.html](http://www.leginfo.ca.gov/html/prc_table_of_contents.html).

In addition to the Public Resources Code, policy for the Department of Parks and Recreation is set by the California State Park and Recreation Commission. Off Highway Motor Vehicle Recreation Division (OHMVR) policy is set by the California Off Highway Recreation Commission. The Natural Resources Division at Sacramento headquarters is responsible for providing leadership, policy direction and technical support for the management of the Department's natural resources. It also manages statewide natural resource funding programs, develops and maintains statewide information systems and databases, and coordinates compliance with statutory requirements. Three Service Centers provide for park facility development and the concomitant environmental review and mitigation.

On-the-ground responsibility for resource management rests with the 21 State Park District Superintendents, 6



# nia State Parks

State Parks

By: Cynthia L. Roye



OHMVR District Superintendents and their employees, especially District Resource Ecologists. In most cases, the resource management function in the Districts is lead by a natural resource manager, typically classified as a Senior State Park Resource Ecologist. The number of natural resource staff and their specialties in a district varies depending on the size of the Districts (number of units and their acreage) and resource management needs. Over 70 permanent natural resource management specialists, including plant ecologists, wildlife biologists and geologists, work in California State Park Districts. State Park Rangers, park maintenance staff, and seasonal employees, including Park Aides and Environmental Services Interns, also assist in conducting resource management activities. While this staffing level represents an expansion of resource management personnel over the past 20 years, it is still only a fraction of the workforce needed to manage our diverse resources.

The Department uses contractors to implement many resource management projects. Even then, efforts would be much less effective without a dedicated cadre of volunteers, both individuals and organized groups, such as the wildland restoration teams, conservation societies, and park cooperating associations and foundations.

Planning for exotic plant eradication begins when an infestation is recognized as an obstacle preventing attainment of a management objective, or desired condition, for a given piece of land. Resource managers then determine the extent of the problem, research, and plan eradication or control methods, and obtain funding. A mix of appropriate methods; mechanical, chemical, and biological, are used within California State Parks, but appropriate methods must be individually

determined for each project.

For the greatest effectiveness, attempts are made to plan and conduct exotic eradication in partnership with adjacent landowners. An inclusive watershed management approach is sought in order to control upstream seed sources wherever possible. Weed Management Areas have

simplified relationships with state and federal agency neighbors and have increased contact with private landowners willing to collaborate to solve common problems. The Department is involved in many WMAs: Alameda – Contra Costa, Butte, Santa Barbara Counties and the Central Sierra WMA, to name a few. Most of State Parks' weeds are wildland weeds, but where A rated weeds are found in parks the Department contacts and collaborates with the County Departments of Agriculture to eradicate infestations. For example, diffuse knapweed and Scotch thistle in Ahjumawi-Lava Springs State Park are being controlled with herbicides by contract with Shasta Co. Dept. of Agriculture. (for more information on state listed A, B, and C rated weeds, [www.cdfa.ca.gov/weedinfo](http://www.cdfa.ca.gov/weedinfo))



Scot Martin

*Lower Sentenac Canyon, Anza-Borrego State Park, before removal of tamarisk, see next page for post treatment photo.*

weedinfo)

Department resource managers attempt to strike a balance between large-scale initial attack on problem weeds and the necessary long-term control. Upon printing of this newsletter, funding available for exotic plant control this year is uncertain because the state's budget has not yet been

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adopted. However, about \$500,000 is expected to be approved for maintenance-level efforts. Additional funding should be available for special eradication projects. In the last two years, about \$2 million was allocated for exotic eradication. Of that, \$499,000 was dedicated to the fight against Cape ivy alone. Like all other governmental agencies, the Department's budget fluctuates with the national and state economy. Previous budget downturns have inflicted painful lessons in the long-term nature of controlling infestations of exotic plants and restoring native plant communities. Such a long-term effort requires a long-term committed funding source.

## California State Parks Exotics Eradication Case Studies, variations on a theme:

### *Use of Fire to Control French Broom, Mt Tamalpais State Park*

**Contributed by Marin  
District Resource Ecologist,  
David Boyd**

Inexpensive and effective methods of controlling large populations of exotic plants are desperately needed. In 1994 a project to control French broom using fire was initiated at a wildland/urban intermix location at Mt. Tamalpais State Park, Marin County, California. To date, two large stands of broom have been cut and the dried stems broadcast burned in place. This burning successfully killed all mature plants, eliminating their ability to re-sprout.

French broom produces long-lived seeds and seed bank elimination must be an important element of any control strategy. The project area was a grassland prior to broom invasion. Broom seedlings can be controlled by the reestablishment and periodic burning of this flammable plant community. To achieve this result, grass seed was sown on one of the sites from which mature plants had been removed and the resulting fuel was prescribed burned in the summer of 1995. This treatment resulted in the death of most of the targeted French broom seedlings. Periodic prescribed burns must take place until seed

bank depletion is complete.

The implications of using fire in a wildland/urban intermix location are also significant. The neighboring community was very supportive of the project, primarily because of fire hazard reduction benefits. Even with this support, the particular location of this site made smoke management difficult. The treatment areas extend up to a ridgeline, which is the park boundary. Unless very specific burning conditions are met, smoke travels at low elevation over this ridge and into residential neighborhoods. Annual or biennial burning must take place initially, but as the number of broom seedlings which become established after burning becomes greatly diminished, smoke impacts must be balanced against the difficulty of using other more labor intensive control methods. Regardless of the method chosen, a continuing long-term control program will be needed to sustain the gains that have been made.

The management objective of this project was to restore a previously existing native grassland. Already there has been a definite increase in the number of native bunch grass species in the treatment areas. Trailside populations have expanded into areas previously occupied by dense stands of broom.

### *Tamarisk Control in Colorado Desert District*

**Summarized from  
an article by Ruth**

**Marvin Webster with additions from ARS  
*Agricultural Research Magazine***

In 1994 a donation from a single anonymous donor provided funding for the Riparian Hit Team with the goal of controlling tamarisk in district streams. To date, about 130 miles of stream have been rid of this noxious weed. Large areas with tamarisk monocultures sometimes require bulldozers. Chain saws and Weed Wrenches allow for more-selective control in mixed stands. This work has been conducted at Anza-Borrego Desert State Park and at Picacho State Recreation Area on the Colorado River. The three-person hit team, led by Scot Martin, works toward this end 10 hours a day, four days a week using primarily mechanical,



Scot Martin

*Brady Van Dragt surveys Sentenac Canyon after cut stump removal of tamarisk with 100% Rodeo, note arrows marking landmarks.*



but also limited chemical and biological control methods as well.

Biological controls in the form of Chinese leafbeetles, *Diorhabda elongata*, and Israeli mealybugs, *Trabutina mannipara*, are being investigated to control this invasive plant. Normally, control agents are approved for direct release into target areas. But this time, researchers have faced a unique complication.

"Saltcedar replaced native willows that an endangered bird—the southwestern willow flycatcher (*Empidonax traillii eximius*)—relied on for nesting," says ARS entomologist Jack DeLoach. "The bird has since adapted to nesting in saltcedar, so we have to ensure that the beetles won't remove the weed faster than we can reestablish native plants for

the birds." DeLoach is in the ARS Grassland Protection Research Unit at Temple, Texas.

To protect the bird, while controlling the weed, the scientists implemented an extra step, in concurrence with Animal and Plant Health Inspection Service and the U.S. Fish and Wildlife Service: a 3-year experimental phase that begins with the beetles in cages. This allows scientists to monitor the rate at which the beetles damage

the saltcedar before the insects are relocated to other critical habitats. Despite the endangered species concerns, scientists are confident that the biological control approach is the right choice for managing saltcedar.

Paul Jorgensen, Colorado Desert

District Resource Ecologist with primary responsibility for this project, has found that native riparian taxa such as willows revegetate quickly where tamarisk has been removed from small patches. In large areas where bulldozers have been used it is necessary to revegetate with willow and cottonwood. Jorgensen said, "for every 100 hours of labor, it takes about four hours the next year. And you had better put that four hours in."

Sources:

1. Ruth Webster, *Riparian Hit Team tries to tame tamarisk*, North County Times: <http://www.nctimes.com/news/2001/20010121/dd/html>
2. Foreign Agents Imported for Weed Control, USDA, ARS Agricultural Research magazine: <http://www.ars.usda.gov/is/AR/archive/mar00/weed0300.htm>

*"In 1994 a donation from a single anonymous donor provided funding for the Riparian Hit Team with the goal of controlling tamarisk in district streams. To date, about 130 miles of stream have been rid of this noxious weed."*

## Present and Future Advances

Several State Park Districts are now using GPS and GIS to accurately locate and map infestations of exotic plants. State Parks plans to form a systemwide coverage of this information during 2002 in order to develop a greater understanding of the distribution of the "Worst Offenders" systemwide. This knowledge will help California State Parks allocate resources appropriately and to monitor the effectiveness of control efforts for exotic plants at the population, the District, and the state levels. ❖

*This article was contributed by Cynthia L. Roye, Associate State Park Resource Ecologist, Natural Resources Division, California State Parks, (916) 653-9083 CROYE@parks.ca.gov*

### ***A Bowl Full of Artichoke, Crystal Cove State Park***

**Presented at California State Parks Natural Resource Specialist Training, March, 2001 by Orange Coast District Resource Ecologist, David Pryor**

In a 48 acre portion of Crystal Cove State Park in Orange County called "The Bowl" staff have fought the invasive exotic- *Cynara cardunculus*, artichoke thistle, for the last 8 years, and are only now able to spend funds on true restoration—the replacement of a succession of invasives with native species.

Deb Hillyard, a State Park Resource Ecologist, worked to significantly reduce the size of the infestation in the 80's until funding fell through allowing the infestation to regrow substantially. Starting again 8 years ago and continuing today, several methods to kill the artichoke have been employed (no bio controls), including: aerial spraying, mowing, hand spraying, pre-emergent spraying, cutting seed heads, prescription fires in successive years, UC research plots studying phenology, and now a new broadleaf, thistle-specific herbicide. In the term of treatment, 85+% cover of artichoke is now approaching approximately 3% with a positive response from native shrubs and forbs. The take home message: Win the battle and the war. Weed control is a multiple year effort with an emphasis on maintainance requiring continuous follow-up treatments.

## Upcoming Events:

**September 24-25**

**California Statewide Weed Management Area  
3<sup>rd</sup> Annual Meeting**

This meeting is an opportunity to hear presentations on the evolution of the WMA program, share success stories, discuss challenges, and foster enthusiasm and collaboration among the different groups.

For more information see article on page 2.

**September 26-28, 2001**

UC Davis Weed Science School 2001

For more information contact Kitty Schlosser at the Weed Research and Information Center 530 752-7091. [meschlusser@ucdavis.edu](mailto:meschlusser@ucdavis.edu)

**October 1-4, 2001**

**11th International Conference on Aquatic  
Invasive Species**

**Hilton Alexandria Mark Center, Alexandria,  
Virginia**

The U.S. Army Corps of Engineers is the hosts the 4 day conference considered the most comprehensive forum for the review of accumulated scientific knowledge, presentation of the latest field research, introduction of new technological developments for prevention, monitoring, control and mitigation, and discussion of policy, legislation, public education and outreach initiatives related to aquatic invasive

species.

For more information:

[www.aquatic-invasive-species-conference.org](http://www.aquatic-invasive-species-conference.org)

**October 5-7**

**California Exotic Pest Plant Council 10th  
Anniversary Symposium**

"Achievements and Challenges in Weed Management."

For more information see article on page 5.

**October 22, 2001**

**RIDNIS workshop**

**DANR Cooperative Extension Auditorium,  
Stockton, CA**

Third annual RIDNIS (Reducing the Introduction and Damage of Aquatic Non-Native Species through Education) workshop.

For more information: [www.ridnis.ucdavis.edu](http://www.ridnis.ucdavis.edu)

**October 9-11, 2001**

**State of the Estuary Conference 2001**

**Palace of Fine Arts Theatre, San Francisco**

The State of the Estuary Conference provides a biennial assessment of the ecological health of the San Francisco Bay-Delta Estuary. This conference will bring you the latest information about the Estuary's changing watersheds, impact from major stressors, recovery programs for species and habitats plus take a look at emerging issues. The late afternoon poster session

receptions offer an opportunity to talk informally with those involved in current research and restoration activities.

For more information call the San Francisco Estuary Project at 510 622-2465

**November 15-18, 2001**

**"Strengthening your Partnerships"**

**California Association of Resource Conservation  
Districts annual meeting.**

**Ventura Beach Clarion Hotel, Ventura, CA**

The conference includes cluster meetings, workshops, director training, tours and this year's Speak-Off Competition.

For more information: [www.carcd.org](http://www.carcd.org)

### Resources and publications: IPM in Practice: Principles and Methods of Integrated Pest Management

A new manual from the University of California Statewide IPM Project. It is a comprehensive guide to field monitoring and pest management decision making. The authors drew on the knowledge of over 50 experts from the University of California, California State University, and in private practice. Available online at <http://anrcatalog.ucdavis.edu>



**California Interagency  
Noxious Weed Coordinating  
Committee  
Noxious Times**

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